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## NAMRU-6 Investigators Work with Medical Staff on USNS Comfort

Story courtesy of NAMRU-6 Public Affairs



NAMRU-6 researchers onboard the USNS Comfort (T-AH-20) during its stop in Trujillo, Honduras as part of the FY15 Continuing Promise mission. (From left) Lt. Nathanael Reynolds, Dr. Faviola Reyes, Dr. Giselle Soto, Lt. Cmdr. Mark Simons. (Photo courtesy of NAMRU-6 Public Affairs)

LIMA, Peru - Travelers' Diarrhea is a frequent cause of illness and lost productivity among deployed military members.

In recent years there have been several deployments of U.S. military in the SOUTHCOM region for humanitarian assistance and disaster relief (HA/DR) missions, as well as capacity building missions, with recent examples including HA/DR missions to Haiti following the earthquake in 2010 and annual New Horizons capacity building missions in Central America.

In order to better understand the health risks to military personnel deployed to Latin American countries, researchers at the U.S. Naval Medical Research Unit - No. 6 (NAMRU-6), are leading a study titled, "Epidemiology and Etiology of Travelers' Diarrhea Among Military Personnel Deployed to Latin America," that is funded by the Armed Forces Health Surveillance Center Global Emerging Infections Surveillance (GEIS) program.

NAMRU-6 researchers Lt. Cmdr.

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## NMRC Commanding Officer Message



This year, October 13, the Navy celebrated 240 years of the country's naval presence around the globe, around the clock. 240 years of service has proved a strong, forward-deployed Navy, is key to America's success. Our Navy's heritage is steeped in innovation, and this includes numerous notable achievements from Navy Medicine research and development. I start most mornings reading the BUMED News Clips distributed by our stellar Public Affairs team, and each day it strikes me how the research we conduct throughout the Navy Medicine Research & Development enterprise is both at the core and forefront of the care we provide to our warfighters. Just this week there were highlighted stories on improved casualty survival in spite of increased severity and complexity of injuries, on the importance of reducing stigma for mental health care even among senior leaders, and on the gains we've made in developing new screening protocols for concussion. Navy Medicine R&D is about providing answers and development solutions for health and medical issues for our Sailors and Marines for every setting in which they deploy, which can be anywhere. Our eight research commands continue

to work on projects ranging from vaccine and drug development to fatigue, resilience, and disorientation for settings on land, sea and air to protect America's finest young men and women who are stationed in the U.S. or deployed around the world with boots on the ground or aboard ships, submarines, and aircraft. They depend on us. The research we do is having a direct impact on the health and medical readiness of these Sailors and Marines. Our past scientists' and researchers' incredible efforts and accomplishments laid the cornerstones for the foundation of the current research and development enterprise, which today is a large, complex, global organization unlike any other in the U.S. Navy. Be proud of the advancements that have been made in modern military medicine, as they would not have happened without the dedication and determination from the hundreds of research scientists who come to work every day dedicated to improving care to our warfighters.

Happy 240th birthday to the United States Navy!

**NMRC Commanding Officer Sends,  
Jacqueline D. Rychnovsky, CAPT, NC, USN**

## NAMRU-SA Commanding Officer Message

First, I'd like to say how excited I am to assume command of the Naval Medical Research Unit-San Antonio (NAMRU-SA). As I walk the hallways and labs of NAMRU-SA and see the diverse, interdisciplinary teams at work, I am inspired and proud to see how NAMRU-SA supports Science, Engineering and Math (STEM) programs by providing opportunities for a new generation of scientists. The Department of the Navy, through the Office of Naval Research, recognizes a healthy investment in a STEM workforce is critical to meeting the future needs of the Navy and Marine Corps. Over the past few years NAMRU-SA has gladly mentored STEM undergraduate and graduate students for 10 weeks during the summer through the Naval Research Enterprise Intern Program (NREIP). Our NREIP students participate in research under the guidance of a principal investigator who also serves as their mentor. I understand the value of mentors, because I had several mentors throughout my career. At NAMRU-SA students conduct research, learn how to present their work, and receive professional comments. With the guidance of the mentor, the NREIP student's research will often set the stage for future studies at NAMRU-SA. The program has been an outstanding example of what we can accomplish to support STEM when we bring in students from diverse backgrounds and get them excited and keep them excited about their work in science disciplines. My only disappointment is that we don't often know what happens to them after they return to school. We intend and hope that the training and experience received at NAMRU-SA has served to keep them on a research path. In addition to the NREIP summer intern program, NAMRU-SA has a Postdoctoral Fellowship program to provide a novel training experience, beyond academia and industry. The program offers a taste of military culture, state-of-the-art research facilities, and an opportunity to conduct research focused on improving the lives of wounded warfighters. Currently, NAMRU-SA has seven Postdoc Fellows and these young researchers bring a unique and innovative skill set to the command that can develop and improve solutions for the warfighter. Under my leadership NAMRU-SA will continue to support Naval STEM initiatives and attract the best and the brightest to the ranks of our research science workforce.



**NAMRU-San Antonio Commanding Officer Sends,  
Elizabeth Montcalm-Smith CAPT, MSC, USN**



(continued from page 1)

Mark Simons, Lt. Nathanael Reynolds, and Dr. Giselle Soto, with the support of Honduran contractor Dr. Faviola Reyes, went aboard the USNS Comfort (T-AH-20) during a stop in Trujillo, Honduras, September 1.

The NAMRU-6 team met with Lt. Cmdr. David Cepeda; Lt. Cmdr. Edward Hurd; Chief Hospital Corpsman Amylyn Ross; Lt. Joel Valdez; and, Hospital Corpsman 1st Class Carrie Barnes, to discuss continued case detection of diarrhea during the Comfort's recent mission, and to implement post-deployment surveys at the end of the mission in order to better understand the burden of disease among the Sailors.

"Most people don't report to sick call when they have mild diarrhea and many of the crew were given antibiotics during their travel medicine screening," said Ross. "They usually treat themselves without seeking medical care."

In support of the under-reporting issue, Hurd and Cepeda from the ship's Department of Public Health showed Simons and his team the report reflecting a low (but steady) stream of cases reported daily throughout the deployment.

However, according to Valdez and Barnes, the laboratory received less than 10 total samples for stool culture and none were positive for enteric pathogens. Simons highlighted the inability of basic stool culture to detect pathogenic



*The NAMRU-6 team discusses laboratory issues and testing strategies to enhance detection of enteric pathogens from Comfort's personnel. Capturing stools and bacteria isolates is important to understand the causes of diarrhea as well as to detect antibiotic resistance, which is another focus of the NAMRU-6 mission. Pictured left to right: Lt. Cmdr. David Cepeda, HM2 Carrie Barnes, Lt. Nathanael Reynolds, Lt. Cmdr. Mark Simons. (Photo courtesy of NAMRU-6 Public Affairs)*

*E. coli* bacteria and enteric viruses, recommending that the lab freeze samples to send to NAMRU-6 for analysis using multiplex molecular methods that can provide a snapshot of the most common bacteria, viruses, and parasites.

Collectively, NAMRU-6 and the Comfort team developed a strategy for enhanced monitoring of diarrhea cases through the rest of the mission, particularly important as the crew had several port calls prior to the end of the deployment.

Additionally, the post-deployment surveys promise to provide a wealth of data on prevalence of diarrhea among the crew, common risk factors, lost duty days, and the use of self-treatment strategies versus

medical care seeking behaviors, which can be used for future mission planning and improvements in force health guidelines, and enhancing case detection during future humanitarian missions.

NAMRU-6's mission is to conduct research and surveillance to diminish the threat of infectious diseases to the warfighter by developing superior prevention or therapeutic strategies; and to serve the health interests of the people of Peru and South America.

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*Graphic illustration by Mikelle D. Smith, Naval Medical Research Center Public Affairs*

# NHRC: READINESS THROUGH RESEARCH & DEVELOPMENT

*Blog by Capt. Rita G. Simmons, Commanding Officer, Naval Health Research Center*

*SAN DIEGO – “Readiness through Research and Development” at the Naval Health Research Center (NHRC), is not just our motto, it’s what we do and it is a vital part of our mission. Our scientists study how physical and psychological stressors impact warfighters. After more than a decade of war, we know the stressors of military service, on top of the day-to-day stressors we all face, can take a toll on the active duty population and their families.*



*The NHRC Millennium Cohort Study is the largest longitudinal study in military history with more than 200,000 participants. Using data from the study, researchers have come to understand the risk factors such as suicide, depression, and post-traumatic stress disorder (PTSD) that impact the psychological health of service members. (Photo courtesy of NHRC Public Affairs)*

Our researchers develop practical applications designed to lessen the impact of psychological stressors with the goals of improving mental health and supporting operational readiness.

We are leading the way in identifying gaps in mental health research, developing methods for early identification of psychological illnesses and injuries, and designing more effective prevention and intervention strategies.

The NHRC Millennium Cohort Study is the largest longitudinal study in military history with more than 200,000 participants.

Using data from the study, researchers have come to understand the risk factors such as suicide, depression, and post-traumatic stress disorder (PTSD) that impact the psychological health of service members. Our research findings are helping military leaders and clinicians develop better ways

to safeguard the psychological health of warfighters.

The NHRC Recruit Assessment Program (RAP) was initiated in 2001 to assess baseline, pre-service psychological health data to better understand the health outcomes of military service.

Using this information, researchers are able to study the impact of service and deployment-related stressors on the psychological health of service members by accounting for childhood psychosocial experiences and baseline psychological health. In addition to our larger, long-term studies, scientists work on numerous projects that contribute to the growing body of research regarding many psychological health risk factors including environmental factors associated with substance abuse and resilience factors among Navy hospital corpsmen due to the unique stressors of their occupation.

Prevention through early detection is key to good mental health and readiness. One way our researchers are working on the early detection of behavioral health problems is through the U.S. Naval Unit Behavioral Health Needs Assessment Survey (NUBHNAS). The assessment addresses behavioral health topics including PTSD, suicidal thoughts, sexual assault, anxiety, depression, sleep disturbances, and mental health stigma.

The goal of NUBHNAS is to improve individual readiness through an anonymous behavioral health assessment and providing individual feedback as well as a unit leadership debrief. The debrief, comprised of non-identifiable personal information, provides a snapshot of the current status of a unit's behavioral health. Using the information provided by NUBHNAS, unit leadership has the potential to improve

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force readiness and reduce PTSD and suicide rates through early detection and corrective action.

By developing the tools to detect mental and behavioral health concerns before they become incapacitating illnesses and injuries, NHRC's research is supporting clinicians and unit leaders in their efforts to preserve individual readiness and maintain a mentally fit and psychologically ready fighting force.

Two other areas of research focus on early detection of mental health problems include the Primary Care Screening Methods (PRISM) study, which is a reliable screening tool for primary care providers, and the development of a computer-based suicide risk assessment tool to help clinicians and leaders identify service members at risk by calculating a suicide risk score through an analysis of individual risk and protective factors.

The NHRC research team excels at taking research results and translating it into real-world, actionable strategies. Promoting psychological health through building resilience, reducing stigma, managing stress, and facilitating positive behavior change is an important aspect of our work and we have developed several evidence-based products that do just that including:

\*The *Post-Deployment User's Guide* is a self-help workbook for service members returning from combat to help them manage their transition, reduce stress, and optimize positive factors.

\*Educational materials for leaders to help proactively support reducing stigma related to seeking help for mental health issues.

\**Life After Service* is a workbook designed to support transitioning service members as they reenter civilian life with a focus on behavioral health concerns— social ties, anger, pain, and sleep.

\*Substance abuse prevention campaign materials designed to reduce high risk drinking and improve readiness.

\*A graphic novel, *The Docs*, developed to prepare Navy Corpsmen for the stresses of combat deployment and to teach them psychological first aid.

\*In addition to our products, NHRC researchers are developing interventions to improve the mental health outcomes of target populations including:

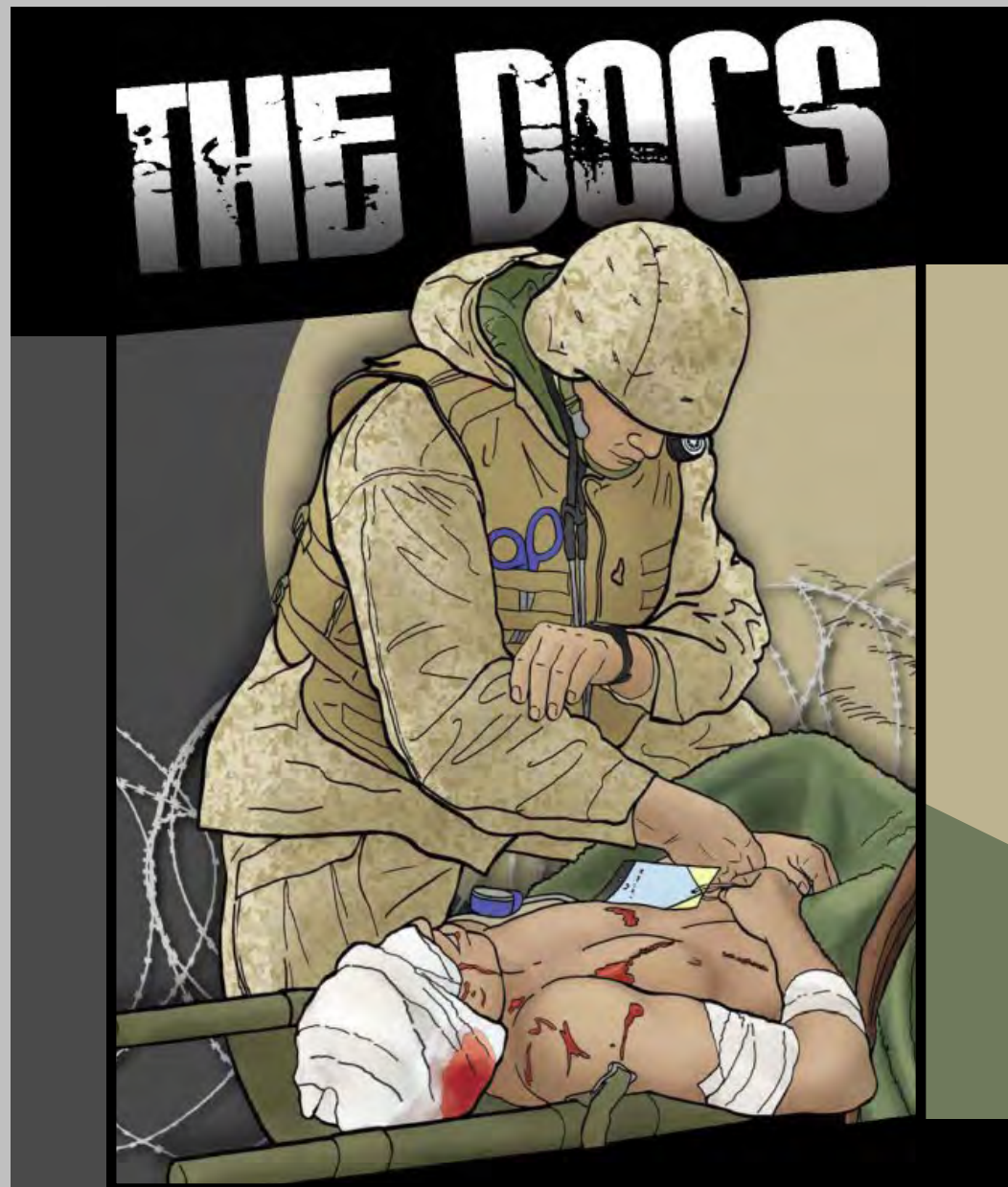
\*A new treatment for comorbid PTSD and depression that combines evidence-based treatment for both diagnoses (cognitive processing therapy and behavioral activation) and compares the effectiveness of the combined treatment to cognitive processing therapy alone.

\*An intervention for Marine Corps recruits

with musculoskeletal injuries to improve their psychological health during their recovery to reduce recovery times and improve graduation rates.

\*Implementation of a customized program for the Navy's Explosive Ordnance Disposal (EOD) operators that helps achieve and maintain peak physical and psychological performance.

At NHRC, when we say, "readiness through research and development", that is exactly what we mean. We work to ensure our warfighters are psychologically ready, whether on the battlefield or the home front, by using research as the catalyst to develop practical applications.



# Introducing the Reduced Oxygen Breathing Environment at NAMRU-Dayton

Story by Lt. Cmdr. Mike Tapia, NAMRU-Dayton



*The Reduced Oxygen Breathing Environment (ROBE), a 12 x 21 ft. room capable of simulating altitudes from sea level up to 30,000 feet mean sea level. The ROBE at NAMRU-D is the Navy's first operational hypoxia chamber built specifically for altitude research. (Photo courtesy of NAMRU-Dayton Public Affairs)*

DAYTON, Ohio - As hypoxia related incidents continue to plague aviation, the Naval Medical Research Unit – Dayton (NAMRU-D) Aeromedical Directorate pursues several strategies for in-cockpit hypoxia detection and recovery from hypoxic stress.

Continuing with this effort to mitigate the risks of hypoxia, NAMRU-D introduces the Reduced Oxygen Breathing Environment

(ROBE), a 12 x 21 ft. room capable of simulating altitudes from sea level up to 30,000 feet mean sea level. With its open floor design, it can serve as both a training chamber and as a flexible research device.

Unlike the legacy altitude chamber which simulates altitude by reducing air pressure, the ROBE reduces the amount of oxygen present in the air.

Both simulations induce hypoxic

hypoxia through comparable reductions in the partial pressure of oxygen. However, the ROBE system does so without the concomitant risks for decompression sickness or arterial gas embolisms associated with reduced pressure exposure.

An additional benefit of the ROBE is its price tag. Both initial and lifecycle costs of the ROBE are a fraction of those for the hypobaric

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# Diversity Enriches Science – Women in Researcher at NHRC

Story by Regena Kowitz, Naval Health Research Center Public Affairs

SAN DIEGO – Strong role models are needed to encourage diversity in the science community and inspire young students to pursue science, technology, engineering, and math (STEM) professions. At the Naval Health Research Center (NHRC) there are several women blazing career paths worth emulating. When it comes to STEM professionals, NHRC has no shortage of smart, forward-thinking female researchers.

This includes the commanding officer and executive officer who have risen through the ranks of their chosen STEM careers to assume leadership positions. NHRC Commanding Officer, Capt. Rita Simmons, was a naval aviator before earning a master's degree in exercise physiology and a doctorate in applied human biology.

"Science is science, no matter whether the researcher is a man or a woman," said Simmons. "But when our research teams are comprised of diverse individuals, people who are hardwired to think differently, we can harness a wider spectrum of possibilities to the research question."

NMRC Executive Officer, Capt. Kim Lefebvre, has a bachelor's degree in pharmacy and dual master's degrees in business administration and operations research.

"My choice of pharmacy as a profession was influenced by the tie-in with science and health care, and being able to bring that to Navy Medicine," said Lefebvre. "My career in the military has been exceptionally rewarding."

For scientists who work for military



*At NHRC, there is no shortage of women pursuing careers as scientists and researchers who make excellent role models for young students interested in STEM education and professions. From left to right: Lt. Cmdr. Lori Perry, preventive medicine physician; Cmdr. Kellie McMullen, microbiologist; and Cmdr. Abigail Marter, board-certified family nurse practitioner and research scientist. (Photo courtesy of NHRC Public Affairs)*

medicine, the experiences and rewards are truly unique. Their work supports warfighters, veterans and their families while making a positive impact on mission readiness and quality of life.

Cmdr. Kellie McMullen is a microbiologist who supports the DoD HIV/AIDS Prevention Program (DHAPP), focusing on laboratory capacity building efforts in more than 65 countries. DHAPP develops and implements military-specific culturally-focused HIV prevention, care and treatment programs for foreign militaries.

McMullen ensures each lab, whether it's being built from the ground up or a renovation, has the appropriate diagnostic equipment, personnel with the right training and the necessary consumable supplies. In the course of her work, McMullen has traveled the globe to places such

as Uganda and Zambia ensuring labs are fully operational while taking into account cultural norms and environmental constraints.

"I have loved biology since I was a little kid," says McMullen. "While in college, I realized that the path to more opportunities in the science arena was to pursue a Ph.D., so I studied molecular genetics in [graduate] school and loved it. It's important to have dynamic, positive, enthusiastic STEM [Science, Technology, Engineering and Mathematics] teachers and role models to get kids excited about critical career paths that are often portrayed as nerdy and uncool."

According to McMullen, the value of having scientists and researchers from diverse backgrounds gives you "multiple viewpoints and that leads to imagination, new ideas, and

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# New Mural at the Tri-Services Research Laboratory Highlights Joint Research between Military Branches

Story by Ms. Carrie Crane, NAMRU-San Antonio

SAN ANTONIO – A new mural was recently unveiled that highlights the unique joint research facility shared with the Navy, Army and Air Force in the Tri-Service Research Laboratory (TSRL). TSRL is located on Fort Sam Houston, Texas, Joint Base San Antonio (JBSA) and is approximately a 181,000-square-foot-research facility that houses a 45,000-square-foot vivarium. TSRL opened in 2011 and is unique among vivarium facilities across the DoD.

The Naval Medical Research Unit- San Antonio's (NAMRU-SA) Veterinary Science Department and Vivarium are located in the TSRL and the 15 member team provides a variety of services to support diverse research requirements. NAMRU-SA's expertise includes two laboratory veterinarians. This support is available to all investigators and it is all available under one roof.

The TSRL facility includes 40 research laboratories, three state-of-the-art surgical suites, and seven procedure rooms. The NAMRU-SA team works with researchers on protocols that include small to large laboratory models and provides basic veterinary medicine to critical care procedures.

NAMRU-SA's veterinary science team provides critical support services to Navy specific research for traumatic hemorrhagic shock and resuscitation, blood replacement products, regenerative medicine and various types of testing and evaluation projects.

"Every NAMRU-SA project conducted at TSRL is directed toward the development of a life-saving technology that will result in better outcomes for warfighters, and our veterinary science team plays a critical role," said NAMRU-SA Commanding Officer, Capt. Elizabeth Montcalm-Smith.

NAMRU-SA has developed collaborations with the Air Force 711th HPW/RHD, as well as the 59th Medical



The new (15' x 53' feet) mural on the lobby wall at the Tri-Services Research Laboratory is an image of "jointness" representing a unique DoD asset that supports research collaboration between the Army, Air Force and Navy. (Photo by Flisa Stevenson, NAMRU-SA Public Affairs)

Group and the U.S. Army Institute of Surgical Research to leverage their focus areas in hematology, blood banking, trauma-induced coagulopathy and ischemia-reperfusion injury, all of which feed back into work to improve the research produced to care for the warfighters. NAMRU-SA is also in the unique position to have the Air Force and Army as day-to-day collaborators and office-mates at TSRL.

This daily interaction mirrors the camaraderie that occurs in operational situations and provides the necessary expertise and support to complement the research designation of each service.

Currently, NAMRU-SA is supporting the Air Force on several projects, including a bio-effects investigation. The Air Force 711th Group is a line unit which collaborates with the Navy to conduct the medical aspects of their research.

TSRL is truly a tri-service facility and each service directs their own projects aligned to the unique roles and missions. By working together under one roof all servicemembers are able to focus on improving the delivery of effective

products that are approved and available for use in the field or appropriate medical setting.

The staff members at TSRL all share a common passion for the facility and the increased capabilities the tri-service environment creates for military research. The TSRL is significant to NAMRU-SA's mission and supports the Navy's research to optimize warfighter readiness and saves lives.

NAMRU-SA's mission is to conduct medical craniofacial and biomedical research, which focuses on ways to enhance the health, safety, performance, and operational readiness of Navy and Marine Corps personnel and addresses their emergent medical and oral/facial problems in routine and combat operations.



## Diversity Enriches Science – Women in Research at NHRC

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innovation.”

Cmdr. Abigail Marter is part of NHRC’s health and behavioral sciences team. She’s been a registered nurse for 19 years, eight of which were spent as a board-certified family nurse practitioner. She also has a doctorate degree. As a new member of the NHRC team, Marter will study families and stressors associated with military life.

Marter has always enjoyed science and biology and wanted to pursue a career that combined scientific knowledge with a personal touch. Marter’s profession affords her to proactively affect the health of others.

“In my current role conducting R&D for the military, I am able to answer questions that will directly

affect the health and well-being of my colleagues in uniform and that is incredibly rewarding,” says Marter.

Marter’s personal experiences have influenced her professional pursuits.

“Each of us approaches our life and work from a unique perspective, colored by our past experiences, our familial culture and our genetics,” said Marter. “My work with military families, both as a family nurse practitioner and a research scientist, is a direct extension of my own life experiences.”

Lt. Cmdr. Lori Perry is a preventive medicine physician with NHRC’s operational infectious disease directorate. Perry’s role includes planning, initiating and running clinical trials regulated by the U.S. Food and Drug Administration (FDA).

When it came to deciding her

career path, Perry says she knew she wanted to be a physician, but she also knew that she wanted to have time for her family.

“A career in preventive medicine allowed me to participate in the best aspects of medicine—preventing disease, public health practice, and research—while giving me the flexibility to be there for my kids.”

Perry found more options for her specialty in the military, particularly for conducting research and development. She said being a preventive medicine physician in the Navy has been both exciting and challenging.

For future scientists looking for role models, the diverse team of STEM professionals at NHRC are worth emulating.

## Introducing the Reduced Oxygen Breathing Environment at NAMRU-Dayton

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chamber.

The ROBE also expands the capabilities of the single user hypoxia trainer, the Reduced Oxygen Breathing Device (ROBD), by providing a mask-free breathing multiuser platform. By eliminating the need for a mask, the ROBE provides a more realistic training environment to simulate likely hypoxic exposure scenarios in most aircraft and eliminates the tether a mask imposes to free the user’s unencumbered movement.

Although this technology was developed through a Small Business Innovation Research (SBIR) initiative that delivered two similar prototype training systems to Naval Air Station Pensacola and the Aviation Survival Training Center at Miramar, the ROBE at NAMRU-D is the Navy’s first operational hypoxia chamber built specifically for altitude research.

As the next generation hypoxia trainer, the ROBE is expected to replace the hypobaric chambers at several aviation training centers across the United States in the near future.

The first project using the ROBE, which began in Aug. 2015, compares symptomology between the three hypoxia devices – hypobaric chambers, ROBD and ROBE to determine if the reduced oxygen devices are valid alternatives for conducting altitude training in place of the hypobaric chamber.

With the addition of this device, NAMRU-D remains at the cutting edge for applied hypoxia research and is prepared to function as the center for Naval Aviation training curriculum development.

# NAMRU-6 Partners with Academia to Investigate New Spatial Repellent Product

Story by Lt. Robert D. Hontz, NAMRU-6

LIMA, Peru - Dengue virus (DENV) sits near the top of the Department of Defense (DoD) priority pathogen list. There are an estimated 390 million DENV infections worldwide each year and transmission often occurs in tropical and sub-tropical regions where military personnel operate.

Although considerable efforts are ongoing within academia, private industry, and the DoD to develop a vaccine, vector control still remains the best option at this time for reducing DENV transmission and disease burden among local populations and deployed military personnel.

The U.S. Naval Medical Research Unit No. 6 (NAMRU-6) recently began evaluating a prototype spatial repellent (SR) product against adult *Aedes aegypti* the primary vector for DENV. The goal of this project is to obtain evidence that SRs lessen contact between household residents and mosquitoes, reducing DENV transmission.

Funded for three years by the Bill & Melinda Gates Foundation, this collaborative effort will measure the effects of this product on adult mosquitoes and residents within houses in Iquitos, Peru, which is the only site of this multi-site project designated to test the SR against the dengue vector *Aedes aegypti*. Four other sites will evaluate its impact against malarial mosquitoes.

“The study site we wanted for demonstrating the ability of a spatial repellent to prevent dengue was based on several criteria,” explained one of the study’s Principal Investigators from the University of Notre Dame, Dr. Nicole L. Achee. “This included having



Five members of the NAMRU-6 vector surveillance team prepare to enter a home to perform mosquito collections as part of the Gates Foundation SR study. Inside this home there are cards suspended from the ceiling that contain either SR chemical or blank control. (Photo courtesy of NAMRU-6 Public Affairs)

field teams that were well-experienced with conducting both entomological and epidemiological surveys, having the laboratory infrastructure required for processing both mosquito and human samples and, perhaps most important, dedicated investigators with detailed knowledge of dengue transmission dynamics.”

This study will be a prospective, randomized cluster, participant and observer-blinded, placebo controlled trial to measure the impact of the SR product on new dengue infections.

Household clusters containing 100-120 residents that tested negative (naïve) or positive for one DENV serotype (monotypic) will be selected from 13 Peruvian Ministry of Health zones within Iquitos.

Each zone will contain two clusters of homes. One will receive plastic sheets impregnated with SR, the other with blank sheets. Sheets will be suspended from the ceiling equidistant from each

other to ensure adequate chemical coverage based on the size of the home.

According to Dr. Amy Morrison, NAMRU-6 Iquitos scientific advisor, city residents are always ready and willing to participate. “In Iquitos, if a project involves a vector control intervention, people can’t sign up fast enough!”

This study will generate rigorous entomological and clinical evidence; documenting and evaluating SR product impact on mosquito densities and human infection rates that can later be used by DoD, academia, industry partners, and public health officials globally, nationally, and locally to recommend inclusion of SR products in vector-control programs.



# NMRC Officer Receives EHO of the Year Award and Ohio State University Alumnus Award

Story by Mikelle D. Smith, Naval Medical Research Center Public Affairs



*U.S. Navy officer, Cmdr. Michael D. Cassady, is an Environmental Health Officer (EHO) with more than 30 years of experience in the Navy has been recognized as the 2014 Capt. George J. Hansel Environmental Health Officer of the Year, as well as the 2015 Franklin Banks, William R. Gemma Distinguished Alumnus Memorial Award from his alma mater, the Ohio State University, College of Public Health (CPH) and CPH Alumni Society. (Photo by Mikelle D. Smith, Naval Medical Research Center Public Affairs)*

SILVER SPRING, Md. – Naval Medical Research Center (NMRC) is a diverse command comprised of military personnel from various career fields related to medical research, diagnostics and investigation. Among those professions is one known as environmental health, and one NMRC officer recently received recognition for outstanding work in the field.

U.S. Navy officer, Cmdr. Michael D. Cassady, is an Environmental Health Officer (EHO) with more than 30 years of experience in the Navy having joined in May 1985 and commissioned as a Medical Service Corps officer in June 1993. During this time, Cassady has been to various commands, working with exceptional military personnel and civilians.

For his outstanding achievements, Cassady has been recognized as the 2014 Capt. George J. Hansel Environmental Health Officer of the Year, as well as the 2015 Franklin Banks, William R. Gemma Distinguished Alumnus Memorial Award from his alma mater, the Ohio State University, College of Public Health (CPH) and CPH Alumni Society.

“My public health work with overseas drinking water and environmental issues in the AOR [Area Operational Readiness] while servicing at U.S. Naval Hospital Naples, Italy ... played a

significant part in my selection,” said Cassady. “For the Ohio State recognition, my 30 year career in the Navy, Navy Medicine, and Navy Public Health ... serving around the world in many diverse and varied environments supporting the warfighters and their families, along with a culmination of all my education, experience, successes, and accomplishments led to Ohio State singling me out to be recognize.”

Cassady currently serves as the Contracting Officer’s Representative and Program Manager in NMRC’s Advanced Medical Development Department, and credits additional success in receiving these awards to this placement.

“While I have always appreciated the opportunities afforded to me in the past, since my arrival at NMRC last summer, I have sincerely appreciated the new and exciting opportunities and unqualified support given to me by [former NMRC Commanding Officer] Retired Captain John Sanders, Dr. Prusacyzk, Captain Sheri Parker and current NMRC Commanding Officer Captain Jacqueline Rychnovsky, which ultimately led to me receiving these recognitions. Being a public health professional is hardwork ... to be recognized means a lot to the public health profession as a whole and a lot to me personally.”

## R&D Chronicles

# Navy Medical Research and Project Mercury:

## Part II: The Naval School of Aviation Medicine and the Human Disorientation Device

By Andre B. Sobocinski, Historian, Bureau of Medicine and Surgery

**“You tumbled slowly, twisted and rolled as your body lurched against the tight harness that strapped you to a couch. Then you rotated faster and faster until finally you were spinning violently in three different directions at once—head over heels, round and round as if you were on a merry-go-round, and sideways as if your arms and legs were tied to the spokes of a wheel. It was a wild and sickening sensation. Your vision blurred. Your forehead broke out into a cold, clammy sweat ... [and] you could get sick enough to vomit.”**

**~Virgil I. (Gus) Grissom on Human Disorientation Training, We Seven, 1962**

From 1959 until the launch of Alan Shepherd's *Freedom Seven* capsule in May 1961, the Mercury Seven went through an almost continuous regimen of training and medical tests to prepare them for spaceflight.

Gus Grissom would later joke that the Mercury Seven moved so fast from one training facility to another that in some cases they “outran” the people who were training them.

The schedule of America's first astronauts may have been “disorienting” at times; it could also be said that on occasion their training was designed to be so.

This certainly was the case in 1959 when they went through the Naval School of Aviation Medicine in Pensacola, Fla.

The Naval School of Aviation Medicine, now known as the Naval Aerospace Medical Institute (NAMI), is best known for ensuring physical standards and qualifications of pilots and training aviation medical personnel for operational assignments. For the first decades of its existence (1939-1970), NAMI also operated an extensive basic and applied



*Virgil “Gus” Grissom. Grissom would quip that Mercury Seven moved so fast from one training facility to another that in some cases they “outran” the people who were training them. (Photo courtesy of BUMED Historian)*

research laboratory.

Under the leadership of legendary aerospace medical researcher Capt. Ashton Graybiel (1902-1995), NAMI's research component explored the effects of fatigue, vestibular physiology, neurological science, cosmic radiation and cardiovascular fitness, all of which would prove invaluable for the first manned space flights.

NAMI operated special laboratories for researching spectroscopy, nuclear admission, low-level alpha radiation, medical electronics, ballisto-cardiography and bioacoustics/psychoacoustics. But NAMI also housed two large training devices that set it apart from other aerospace research laboratories. NAMI's Human Disorientation Device (HDD)

and “Slow Rotation Room” were both designed for studying human-performance in motion-based environments and, ultimately, for learning adaptation techniques, training procedures and how drugs could reduce symptoms of disorientation.

First constructed in the 1958 at a cost of \$1 million, the HDD was once described in *LIFE* Magazine as looking

*(continued on page 14)*



# NAMRU-San Antonio Builds New Collaborations at Military Health Symposium

Story by Flisa Stevenson, NAMRU-SA  
Public Affairs

SAN ANTONIO-- Naval Medical Research Unit-San Antonio (NAMRU-SA) investigators joined more than 1,700 military medical clinicians, scientists, and academia and industry leaders at the 2015 Military Health System Research Symposium (MHSRS) held in Fort Lauderdale, Florida, Aug. 17 - 20.

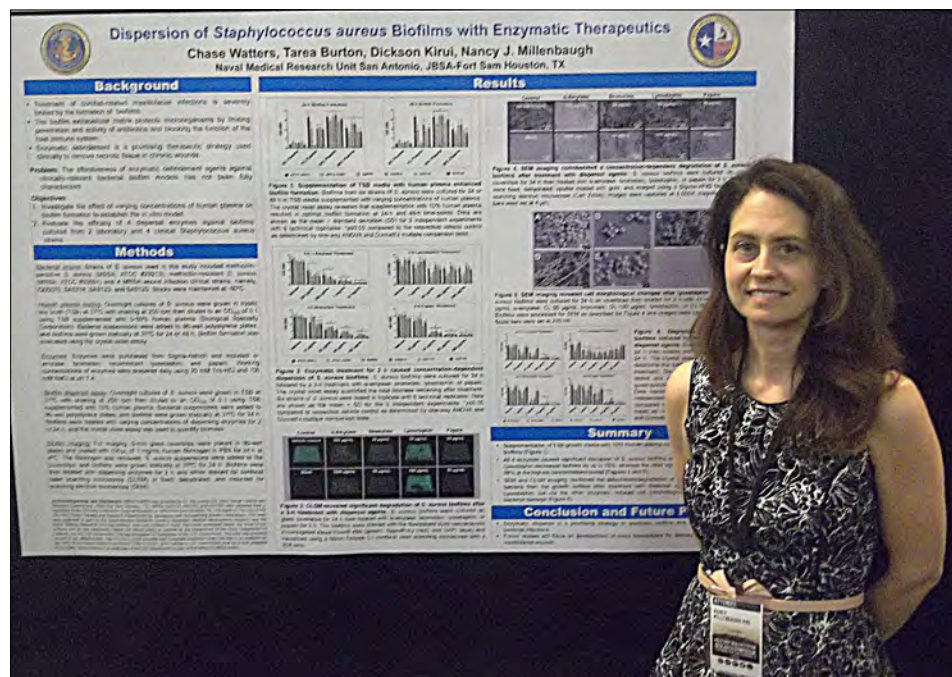
This is DOD's premier scientific annual meeting where research results are shared across the joint forces and future milestones are set for military medical research programs, centered on the needs of the Warfighter.

"NAMRU-SA investigators presented ten posters at the symposium and seized the opportunity to build new collaborations," said NAMRU-SA Commanding Officer, Capt. Elizabeth Montcalm-Smith.

Dr. Nancy Millenbaugh, Principal Investigator, in NAMRU-SA's Craniofacial Health and Restorative Medicine Directorate presented her findings on enzymatic therapeutics as a promising strategy to eradicate biofilms and improve treatment of bacterial infections.

Millenbaugh said, "MHSRS provides an invaluable opportunity to meet and talk face-to-face with researchers you might have never connected with, without this symposium."

As a result of meetings at MHSRS, Millenbaugh and other NAMRU-SA investigators connected with the Pain Research Task Area at the U. S. Army's Institute of Surgical Research (USAISR), also located at Joint Base San Antonio. USAISR has capabilities and laboratory models that would



Dr. Nancy Millenbaugh, Principal Investigator, in NAMRU-SA's Maxillofacial Injury and Disease Department presented her poster, "Dispersion of *Staphylococcus aureus* Biofilms with Enzymatic Therapeutics" at the 2015 MHSRS Symposium. (Photo taken by Dr. Luis Martinez, NAMRU-SA)

complement NAMRU-SA's capabilities and there is a mutual interest in collaborations on joint projects and future proposals.

Montcalm-Smith said, "Other researchers are interested in the accomplishments at NAMRU-SA and want to partner with us on future projects."

Other potential collaborations seeded at MHSRS include the Center for Regenerative Medicine at Oregon Health & Science University, Department of Dermatology & Cutaneous Surgery; Miller School of Medicine at University of Miami, and the Materials Branch/Applied Concepts in Materials Chemistry Division at the Naval Research Laboratory in Washington, D.C.

"It is easy to see why NAMRU-SA has a good reputation," said research advocate, Capt. Francisco R. Leal.

He was interested to hear what NAMRU-SA researchers were investigating such as the mercury collection and filtration system, new methods of sterilization that could potentially be used in the operational environment, and craniofacial wound healing projects.

"With Capt. Leal as an advocate, NAMRU-SA can look forward to building stronger connections with dental officers to better serve their needs and understand their issues," said Montcalm-Smith.

Additional Montcalm-Smith said, as a result of discussions at the 2015 MHSRS symposium NAMRU-SA is moving forward to build new collaborations across the medical research landscape and plans to include toxicology and dental projects at the next symposium.

## Part II: The Naval School of Aviation Medicine and the Human Disorientation Device

(continued from page 12)



*The Navy's Vestibular Physiology Lab containing the HDD, Slow Rotation Room and other devices used to study the effects of disorientation. (Photo courtesy of BUMED Historian)*

like an “automatic cocktail shaker.” The HDD was a large aluminum cylinder that contained a standard pilot seat and a doorway or trapdoor. Test subjects would be strapped into the device and rotated vertically and horizontally to induce vertigo. As its name implied, NAMI's Slow Rotation Room simulated “slowly rotating artificial gravitational environments.”

Constructed in a plywood room 15 feet in diameter and 10 feet high with padded walls, the Room contained two automobile seats that faced instrument dials, an electric stove, shelves stocked with canned goods and books and a number of testing devices (e.g., trashcan for throwing tennis balls into while the room rotated).

The Slow Rotation Room could be programmed to rotate at variable speeds for long durations. Test subjects could stay

in the room from hours to days.

NAMI would continue to collaborate with NASA well beyond Project Mercury.

Its research laboratory was later designated as the Naval Aerospace Medical Research Laboratory (NAMRL) in 1970; four year later, it would become a separate command. It 2011, NAMRL relocated from Pensacola to Wright-Patterson Air Force Base, Ohio, and was renamed the Naval Medical Research Unit (NAMRU)-Dayton.

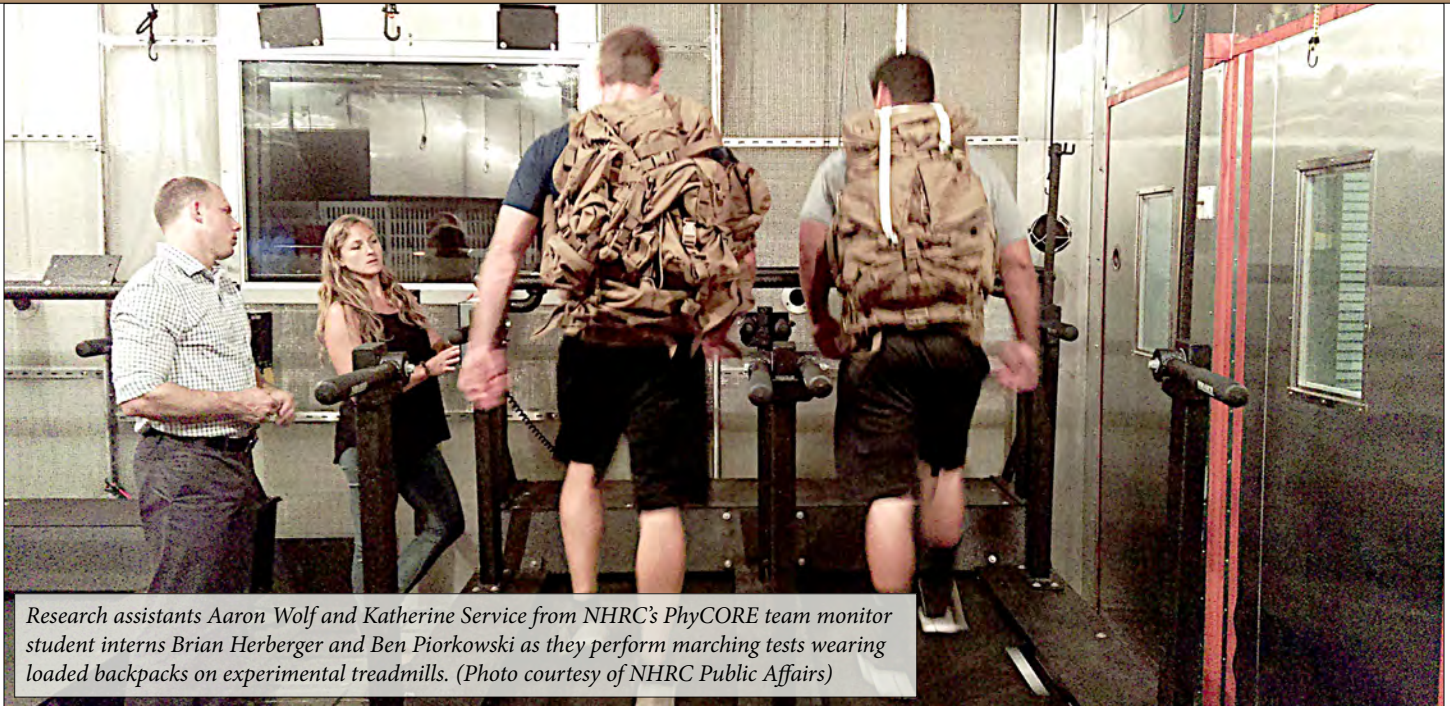
Today NAMRU-Dayton continues on the proud tradition of its forbearer.

*Part III of this series will look at the Mercury Seven's connection with the Naval Medical Research Institute.*



# STEM Interns Get Real-World Experience in NHRC's Virtual Reality Lab

Story by Lt. Michael D. Young, Naval Health Research Center



Research assistants Aaron Wolf and Katherine Service from NHRC's PhyCORE team monitor student interns Brian Herberger and Ben Piorkowski as they perform marching tests wearing loaded backpacks on experimental treadmills. (Photo courtesy of NHRC Public Affairs)

SAN DIEGO - For aspiring young scientists, what could be more exciting than working with cutting-edge virtual reality equipment on a project that has the potential to make a real-world impact on military performance?

That question is being answered by scientists at the Naval Health Research Center (NHRC) who are partnering with local schools to provide high school and college students with hands-on experience.

One team at NHRC actively mentoring these future scientists is the Physical and Cognitive Operational Research Environment (PhyCORE) team in the Warfighter Performance Laboratory. This team conducts research to enhance rehabilitation, training, and assessment of healthy and injured warfighters through interactive and enhanced technology. With a full-time staff consisting of research scientists, engineers, and research assistants, the PhyCORE team stays busy with several ongoing projects using the Computer Assisted Rehabilitation Environment (CAREN) and other state-of-the-art equipment in the laboratory.

The CAREN, one of the lab's most impressive

tools, is a 3D virtual environment with a 180-degree view inside a 9-foot tall curved panoramic screen that provides research subjects and patients the sensory rich experience of movement in an experimentally-controlled setting.

Dr. Pinata Sessoms, a biomechanist with NHRC's PhyCORE team is an avid supporter of STEM interns. "It's great to be able to mentor these students and give them opportunities they wouldn't have had elsewhere."

Interns at NHRC have the opportunity to work with the PhyCORE team, which include training programs to prevent falls in amputees, balance training in warfighters with traumatic brain injuries (TBI), and the evaluation of personal protective equipment.

PhyCORE's interns received hands-on experience with validation efforts for force plate software for future clinical work, analyzed treadmill walking data on a ProtoKinetics walkway, and performed pilot testing as models wearing military backpacks on treadmills.

During the past fiscal year, the PhyCORE team welcomed eight interns, primarily recruited from High Tech High School and San Diego State University. High Tech High School, a charter high school in San Diego's Point Loma neighborhood, has been an excellent source for interns as 34 percent of the school's graduates go on to major in science, technology, engineering, and math (STEM) fields in college—more than double the national average.

While some interns received school internship credits for their work at NHRC, others simply used the opportunity to gain experience using cutting-edge technology. Work generated by the interns has been included in technical reports and presentations, directly contributing to the PhyCORE team's success.

The team's seasoned scientists recognize and appreciate the diverse contributions these interns have made and intend to continue recruiting from high schools with STEM programs and seek other motivated students looking for their first taste of professional research.



# NMRC Sailors Celebrate the U.S. Navy's 240th Birthday

Story, Photos and Graphic Illustration by Mikelle D. Smith, Naval Medical Research Center Public Affairs

SILVER SPRING, Md. - Sailors at the Naval Medical Research Center (NMRC) celebrated the 240th birthday of the United States Navy, Oct. 13.

The ceremony was held in the Albert R. Behnke Auditorium where Sailors came together to honor the mission of the Navy, past, present and future.

This year's theme was "Ready Then, Ready Now, Ready Always," which embodied the journey and mission of the the Navy since its establishment.

(Right): Capt. Judith Epstein (left) and Hospital Corpsman 3rd Class Alison Bellew (right), pose before cutting the cake honoring the Navy's 240th birthday celebration. It is Navy tradition for the oldest and youngest Sailor's at the command to cut the cake during the ceremony.



(Above): Enlisted Sailors part of Naval Medical Research Center's (NMRC) Biological Defense Research Directorate (BDRD), located at Fort Detrick, Md., celebrated the Navy's 240th birthday, Oct. 13. The year's theme was "Ready Then, Ready Now, Ready Always." Officers were also present at the celebration. (Photo courtesy of Hospital Corpsman 1st Class Mark Salvador)



READY THEN

READY NOW

READY ALWAYS